Center Independent Research & Development: GSFC IRAD

Power System Electronics (PSE) Development for SmallSat Technology

Completed Technology Project (2014 - 2016)

Project Introduction

We develop a modular Power System Electronics (PSE) that is reliable, efficient, and flexible to meet the Goddard Modular Smallsat Architecture (GMSA) challenge. With GSFC careful in-house design, we will have control over testing and manufacturing to produce a high quality, affordable PSE compatible with the Common Electronics Board (CEB), and be able to adapt interface and mechanical form factor that directly support NASA's small satellite missions.

To design and implement an in-house flight modular Power System Electronics (PSE) suitable for small satellite science missions; especially to support the Goddard Modular Smallsat Architecture (GMSA).

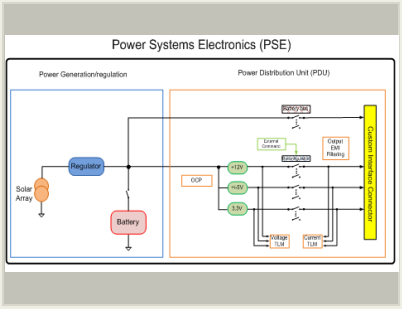
This research will have the following direct return on investment:

- In-house design reduces risk because we take control over all phases: design, parts selection, layout, assembly, integration and test, and tailor them to meet any unique science mission.
- We first focus on circuit functionality to be tested with automotive EE components for smaller footprint, lower cost, and short lead time. In the meantime, we consider space-grade components as an optional recommendation for future missions which involved in a specific radiation environment. The risk will be reduced by validating the final architecture, performing the initial component market searches, testing candidate components, and demonstrating a working prototype board.

Anticipated Benefits

Goddard Modular Smallsat Architecture (GMSA)

Cubesat and Smallsat.



Code 563 PSE block diagram for Smallsat

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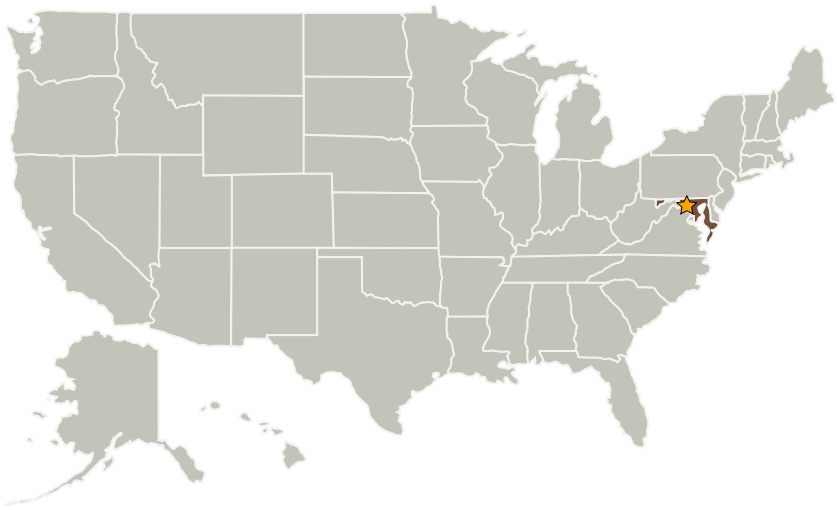
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

Wesley A Powell

Principal Investigator:

Hanson C Nguyen

Co-Investigator:

Melyane Ortiz-acosta

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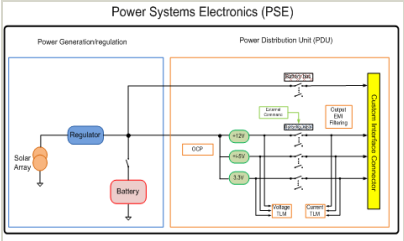
Images



Smallsat PSE block diagram
Code 563 PSE block diagram for Smallsat
(https://techport.nasa.gov/image/4184)

Links

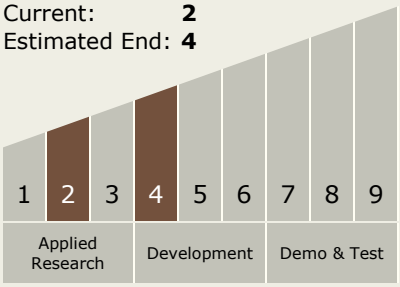
NTR 1437752286
(no url provided)

Project Website:

http://aetd.gsfc.nasa.gov

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.2 Electronics